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Research Article

ECONOMIC APPRAISAL OF ONION PRODUCTION IN DAVANAGERE DISTRICT OF KARNATAKA

RAVEESHA S.[1]*, BARKER R.D.[2], SUMANA D.A.[3] AND ASHOKA N.[4]

[1]Department of Agricultural Economics, College of Horticulture, Hiriyur, 577598, KSN University of Agricultural and Horticultural Sciences, Shivamogga, 577417, Karnataka, India
[2]Department of Agricultural Engineering, College of Horticulture, Hiriyur, 577598, KSN University of Agricultural and Horticultural Sciences, Shivamogga, 577417, Karnataka, India
[3]Department of Agricultural Microbiology, ZAHRS, Hiriyur, 577598, KSN University of Agricultural and Horticultural Sciences, Shivamogga, 577417, Karnataka, India
[4]Department of Agricultural Economics, College of Horticulture, Sirsi, 581402, University of Horticultural Sciences, Udyanagiri, Bagalkote, 587104, Karnataka, India
*Corresponding Author: Email - poonaravi1@gmail.com

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Abstract: Onion is an important commercial vegetable crop not only for domestic consumption but also as highest foreign exchange earner among the fruits and vegetables. Onion was grown on 19.77 million hectares globally, accounting for 96.77 metric tons of production worldwide with 19.20 quintals per hectare productivity. In India, onion occupies an area of 5.30 lakh hectares, with production of 55 lakh tones. Hence, it was felt necessary to undertake a study on economic appraisal of Onion production in Davanagere district of Karnataka. The study was conducted in Davanagere district, which is one of the leading Onion producing districts in Karnataka. Based on the highest area under onion production 4 taluks from Davanagere *viz*., Jagaluru, Nyamathi, Davanagere and Harihara were selected for the study, in each taluk 40 sample farmers were selected for the study. In total, 160 sample farmers selected for the study. Standard farm management cost concepts like cost A, Cost B, Cost C and Farm management income measures were estimated and compared. The Cost C represents total cost of cultivation which was higher *i.e.,* Rs 188684.30 in case of onion seed production compared to onion bulb production (Rs 145414.16). Net returns accrued to onion growers was relatively higher *i.e.,* Rs. 274565.70 in case of seed production compared to onion bulb production (Rs. 71585.84). The economic efficiency is comparatively high in onion seed production than onion bulb production, hence the concerned government authorities should take appropriate policy measures towards economic stability in onion seed production.

Keywords: *Economics, Onion, seed production, Cost, Business and Net returns*

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Introduction

Onion (*Allium cepa* L) is a worldwide culinary and therapeutic spice belonging to the family Amaryllidaceae. It is an important commercial vegetable crop not only for domestic consumption but also as highest foreign exchange earner among the fruits and vegetables. It is commercially cultivated in a little over a hundred countries in the world. However, about three-fourth of global production is accounted by 18 countries: China, India, the United States, Egypt, Turkey, Pakistan, Sudan, Bangladesh, Iran, Russia [1-3].

Onion was grown on 19.77 million hectares globally, accounting for 96.77 metric tons of production worldwide with 19.20 quintals per hectare productivity. India is the second-largest producer of onion after China. Both China and India together contribute 59.70 per cent of the onion production in the globe. India alone contributes a 28.51 per cent share in onion production. India and China have a vast domestic market. In India, onion occupies an area of 5.30 lakh hectares, with production of 55 lakh tones. The major Onion producing states are Maharashtra, Karnataka, Madhya Pradesh, Gujarat, Rajasthan, Bihar, Andhra Pradesh, Haryana, West Bengal, Uttar Pradesh, Chhattisgarh, Odisha, Tamilnadu, Jharkhand and Telangana in the country. In Karnataka, the major onion growing districts are Dharwad, Chitradurga, Vijayapur, Gadag, Davanagere, Kalaburgi, Ckikkamagaluru, Haveri, Bellari, Belagavi, Kolar and Bagalkote [4-7].

Now a day's entrepreneurship related to onion production has got high importance because of global transactions. The entrepreneurs are the key persons of any country for promoting economic growth and technological change. The development of entrepreneurship in onion production is directly related to the socio-economic development of the farmers in India. In a heterogeneous and stratified society like India, it is not adequately realized that, the characteristics which distinguish entrepreneurship may not be only because of its different strata. Therefore, the entrepreneurial activity in a particular section of the population based on present objective must be considered. Presently, development of farmers producing Onion seeds has become the primary concern in the area of Onion production. In this regard, the role played by entrepreneurs also assumes greater importance. Hence, it was felt necessary to study economic appraisal of Onion production both seed and bulb in Davanagere district of Karnataka by considering the global importance of this crop [8-12].

Materials and Method

Locale of the study

By considering onion producing districts in Karnataka, the present study was undertaken in Davanager district, which is one of the leading onion producing district in Karnataka. Jagaluru, Nyamathi, Davanagere and Harihara taluks were chosen for the study. These are the district leading and major onion producing taluks of Davanagere district and comprehensively most of the farmers cultivate onion seeds and bulbs in these taluks [13-16].

Selection of sample farmers

Based on the highest area under onion production, a list of Onion growing villages in four taluks *viz*., Jagaluru, Nyamathi, Davanagere and Harihara was compiled. The sample farmers were selected based on the assistance obtained from Assistant Horticultural Officers (AHO) of the respective taluks and in consultation with Experts opinion in Agriculture and Horticulture. A list of onion producers was collected in each of the selected taluks in consultation with the experts *viz*., Deputy Director of Horticulture and Senior Assistant Director of Horticulture at the district and taluk levels. The data from Horticulture department was used to select the major onion seed growing taluks and villages.

Table-1 Economic appraisal of onion Seed and Bulb production

SN	Onion seed production per ha				Onion bulb production per ha			
	Particulars (onion seeds)	Quantity	Rate(Rs.)	Total cost (Rs.)	Particulars	Quantity	Rate(Rs.)	Total cost(Rs.)
1	Hired men labour (Mandays)	31.65	400	12660(6.71%)	Hired men labour (Mandays)	21.15	400	8460(5.82%)
2	Hired women labour(woman days)	43.55	250	10887.5(5.77%)	Hired women labour (woman days)	63.05	250	15762.5(10.84%)
3	Bullock labour (Pair days)	2.5	750	1875(0.99%)	Bullock labour (Pair days)	3.65	1000	3650(2.51%)
4	Machine labour(hours)	8.65	1100	9515(5.04%)	Machine labour (hours)	11.1	1000	11100(7.63%)
5	Planting material (50 kg bag)	51.4	1210	62194(32.96%)	Planting material (50 kg bag)	8.03	2000	16060(11.04%)
6	FYM (tractor load)	3.45	5500	18975(10.06%)	FYM (tractor load)	2.8	5500	15400(10.59%)
7	Urea(50kg bag)	3.43	276.88	949.7(0.50%)	Urea(50kg bag)	5.58	276.88	1544.99(1.06%)
8	Complex fertilizer(50kg bag)	6.9	1512	10432.8(5.53%)	Complex fertilizer(50kg bag)	6.65	1512	10054.8(6.91%)
9	Micro nutrients (5kg bag)	2.55	1100	2805(1.49%)	Micro nutrients (5kg bag)	3.03	1100	3333(2.29%)
10	Herbicides (kg or liter)	4.18	276.19	1154.47(0.61%)	Herbicides in (kg or liter)	2.78	276.19	767.81(0.53%)
11	Growth regulator (liter)	2.53	552.13	1396.89(0.74%)	Growth regulator in (liter)	2.58	552.13	1424.5(0.98%)
12	Pesticides (100ml packet)	4.23	1488.11	6294.71(3.34%)	Pesticides (100ml packet)	4.45	1488.11	6622.09(4.55%)
13	Fungicides (200g packets)	3.1	252	781.2(0.41%)	Fungicides (200g packets)	5.53	252	1393.56(0.96%)
14	Land revenue			125(0.07%)	Land revenue			125(0.09%)
15	Depreciation			1222.5(0.65%)	Depreciation			6535(4.49%)
16	Interest on working capital @7% per annum appertained for 6 months			5553.98(2.94%)	Interest on working capital @7% per annum appertained for 6 months			4957.58(3.41%)
17					Transportation cost			11780(8.10%)
18	Cost A(summation of 1 to 16)			146823(77.81	Cost A (summation of 1 to 17 particulars)			118971(81.82%)
19	Rental value of land			30601.4(16.21%)	Rental value of land			13750(9.46%)
20	Interest on fixed capital @12% per annum appertained for 6 months			2550.13(1.35%)	Interest on fixed capital @12% per annum appertained for 6 months			1145.83(0.79%)
21	Cost B(Cost A+18+19)			179974.30(95.38%)	Cost B(Cost A+18+19)			133867(92.06%)
22	Family men labour	14.15	400	5660(2.30%)	Family men labour	19.15	400	7660(5.27%)
23	Family women labour	12.2	250	3050(1.62%)	Family women labour	15.55	250	3887.5(2.67%)
24	Total family labour			8710(4.62%)	Total family labour			11547.5(7.94%)
25	Cost C (Cost B+24)			188684	Cost C (Cost B+24)			145414
26	Gross returns				Gross returns			
27	Main product onion seed yield in quintals	5.45	85000	463250	Main product onion seed yield in quintals	155	1400	217000
28	Farm business income(GR-Cost A)			316427	Farm business income(GR-Cost A)			98029.2
29	Family labour income(GR-Cost B)			283276	Family labour income(GR-Cost B)			83133.3
30	Net returns (GR-Cost C)			274566	Net returns (GR – Cost C)			71585.8
	Benefit cost ratio			2.46	Benefit cost ratio			1.49

Further, the best onion seed growing farmers were chosen in consultation with extension personnel from the Department of Horticulture and KVK Hiriyur. 40 respondent farmers (20 onion seed producers and 20 onion bulb producers) in each taluk were selected for the study. As a result, a total of 160 respondents from 4 taluks were chosen for the study.

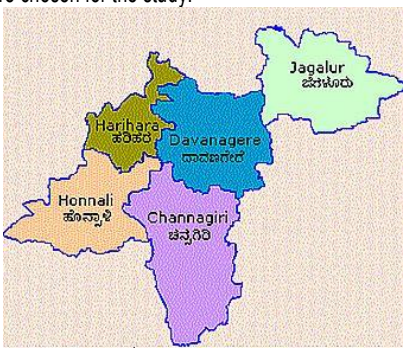

Fig-1 Selection of study area

Economics of Onion Production

Enterprise Budgeting Technique was used to comparative economics of onion seed and onion bulb production. It was hypothesized that; the profit is more in onion seed production as compared to that of onion bulb production. Enterprise budgeting technique is the statement of costs, returns and profit associated with an enterprise. The costs were further divided into variable and fixed costs. Variable costs included expenditure incurred on hired human labour, hired machine labour and hired bullock labour, seeds, planting material cost, FYM, fertilizers, plant protection chemicals, interest on working capital worked out at the rate of interest of 7.00 per cent apportioned for the crop duration of six months. Fixed costs included depreciation on fixed assets used in onion seed and bulb production apportioned on per acre basis. Depreciation was estimated using straight line method considering purchase price, junk value and useful life of the asset. Information on Land revenue was collected from the revenue department and accordingly accounted in the cost of cultivation. Rental value of land was accounted considering the prevailing rental value in the selected sample villages of the study area. Interest on fixed capital was worked out at 12.00 per cent per annum and apportioned for the crop duration of six months. The total cost of cultivation was arrived at by summation of variable costs and fixed costs. Gross return was estimated by multiplying output with prevailing market price. Net returns or profit was arrived at by deducting total costs in Gross returns. To ascertain the economic efficiency of onion seed and bulb production, benefit cost ratio was estimated by taking the ratio of gross returns and total cost of cultivation.

Results and Discussion

Economic appraisal of onion production

[Table-1] depicts the economic appraisal of onion seed and onion bulb production at Davanagere district of Karnataka. The cost and returns were calculated on per hectare basis. Standard farm management cost concepts like cost A, cost B, cost C and Farm management income measures like family labor income, farm business income and net income were estimated and compared in [Table-1]. The Cost C represents total cost of cultivation which was higher at Rs 188684.30 in case of onion seed production compared to onion bulb production (Rs 145414.16). In order to ascertain the comparative profitability of onion seed and onion bulb production, comparative economics of the same was worked out using standard farm management cost concepts and income measures. The requirement of quality planting material was found to be the prime reason for higher cost of cultivation in case of onion seed production. Onion seed production required bulb as the planting material while onion bulb production can be taken up using either seed or bulb as planting material. Vast majority of sample farmers used seeds as the planting material in onion bulb production. The requirement of bulb per hectare was hardly 8kg costing about Rs 2000 per kilogram, whereas onion seed production required bulb of 51.40 bags each bags comprising of 50 kg bulbs. The cost of 50 kg of bulb was Rs 2000. The difference in cost of planting material has widened the difference in cost of cultivation between onion bulb and onion seed production. The other reason would be the rental value of land which was Rs 30601per ha in case of onion seed production, while it was Rs 13750 per ha, in case of onion bulb production. The rental difference was due to the very nature of bulb enterprise. Onion seed production has got more commercial value compared to onion bulb production in the eyes of farmers who leases out their farm. Of the total cost, human labor inclusive of hired and family men and women labour cornered a major chunk at 17.10 per cent and 24.6 per cent in case of onion seed and onion bulb production respectively. Family labor of 14.15-man days and 12.20-woman days were required in case of onion seed production which was relatively lower compared to onion bulb production (19.15 man days and 15.55woman days). The expenditure on machine labour was relatively higher in case of onion bulb production at 7.63 per cent compared to onion seed production (5.04 %). With respect to planting materials bulb of desired quality in case of onion seed production formed 32.96 per cent of the total cost while it was 11.04 per cent in onion bulb production.

The expenditure made on FYM, chemicals fertilizers, micro nutrients, growth regulators, herbicides, pesticides, and fungicides accounted for 22.68 per cent and 27.87 per cent in case of onion seed and onion bulb production, respectively. The expenditure on plant protection chemicals was meager and hovers around two to three per cent in both the cases. Among the fixed cost, rental value cornered major chunk at 16.21 per cent and 9.46per cent in case of onion seed and onion bulb production, respectively. Onion bulb production was observed to be more labor intensive compared to onion seed production as onion bulb production required labor to perform operations like sowing, bed preparation, application of FYM, earthing-up, application of chemical fertilizer, weeding, application of plant protection chemicals, harvesting, denecking, grading and packing. Harvesting, Denecking, Grading is the labour-intensive special operations in onion bulb production. In case of onion seed production, human labor was required to perform operations like planting of bulbs, application of FYM, application of chemical fertilizers, one or two weeding, one or two herbicidal application, application of plant protection chemicals, irrigation using drip, harvesting (12-15 members), drying, and winnowing. Harvesting and planting were found labor intensive. Similar results have been obtained by Kerure, *et al.* (2020) [17]. The expenditure on machine labor was relatively higher in case of onion bulb production at 7.63 per cent compared to onion seed production (5.04%) due to additional machine hour required for performing deep ploughing of black soil. The expenditure made on FYM and chemicals fertilizer accounted to 22.68 per cent and 27.87 per cent in case of onion seed and onion bulb production, respectively. The onion seed growers opined that application of relatively more quantity of FYM for seed production not only improves physical, chemical, and biological properties of soil but also enable them to realize better seed yield through increased mineralization of available soil nutrients. Chemical fertilizer *viz*., urea, DAP, complex fertilizer and micro nutrients usage was also found to be relatively higher in case of onion seed production as compared to onion bulb production since onion seed growers are not ready to lose any chance of getting better seed yields. The expenditure on plant protection chemicals was meager hovering around two to three per cent of the total cost of cultivation in both the cases. The incidence of pests and diseases depends on the prevailing climatic conditions, the cultivar/ hybrid/ land race/ high yielding varieties chosen by the farmers, the management practices adopted by the farmers. Purple blotch, leaf blight are the major diseases and thrips and mite infestation are the major insects causing harm under both the situations. Among the fixed cost, rental value cornered major chunk at 16.21 per cent and 9.46 per cent in case of onion seed and onion bulb production, respectively. Similar results have been obtained by Kerure, *et al*. (2020) [17].

Gross returns realized from a hectare of onion seed production was highest at Rs 463250 compared to onion bulb production at Rs 217000. Net returns were arrived at by deducting Cost C from gross returns. Net returns accrued to onion growers was relatively higher at Rs 274565.70 in case of seed production compared to onion bulb production (Rs 71585.84). If onion bulb and onion seed productions were viewed as family business, then the income accrued to family was arrived at by estimating family business income. Family business income was calculated by negating Cost A from gross returns. Family business income accrued to onion growers was relatively higher at Rs 316427.20 in case of onion seed production compared to onion bulb production (Rs 98029.17).

The economic efficiency of onion seed production reflected in benefit cost ratio was higher at 2.46 compared to 1.49 in case of onion bulb production. Gross returns realized from a hectare of onion seed production was highest at Rs 463250 compared to onion bulb production at Rs 217000. The prevailing price is the prime factor causing differences in realization of gross returns. From the preceding discussion, it could be inferred that onion seed production is more profitable compared to onion bulb production. As onion seed production involves more of market and weather risks compared to onion bulb production, the prospective farmers who wish to absorb above mentioned risks could reap higher returns. Risk lovers always realize greater income compared to risk averters who satisfy with lower returns.

Conclusion

The economic efficiency is comparatively high in onion seed production than onion bulb production, the concerned government authorities should take appropriate policy measures towards economic stability in onion seed production. The Onion growers have more potential in learning and adopting of new technologies both in backward and forward linkages of onion seed producers. Periodic and intensive entrepreneurship development capacity building programmes need to be organized by the Government and other extension agencies for creating awareness about entrepreneurial opportunities, followed by vigorous follow-up, guidance, and counseling for the sustainability of the entrepreneurial activity. There is also need of establishing a separate Entrepreneurial Development Centre (EDC) in the traditional belts of onion seed growing areas to train growers on different components of entrepreneurship for the development of onion seed production in the country by government. Organized market system must be established by the government for fair marketing of the produce for the better price by eliminating obstacles. Minimum support price should be fixed for the produce since there is a fluctuation of the price every year.

Application of research: This research is applicable to onion growers to improve their profits through onion seed production and policy makers to draw suitable policies to improve onion seed production

Research Category: Agricultural Economics

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****Principal Investigator or Chairperson of research: Dr Raveesha S**
University: Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga, 577417, Karnataka, India
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Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Karnataka

Cultivar / Variety / Breed name: Onion (*Allium cepa* L)

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

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